What is claimed is:

5

10

15

20

25

30

35

- 1. An oxide semiconductor electrode comprising: a conductive substrate; and an oxide semiconductor layer provided on said conductive substrate, said oxide semiconductor layer being a porous layer comprising a plurality of porous titania particles which have been joined to each other to define interparticulate communicating pores.
- 2. The oxide semiconductor electrode according to claim 1, wherein the pores possessed by the titania particles per se have a diameter of 10 to 40 nm.
- 3. The oxide semiconductor electrode according to claim 1, wherein said interparticulate communicating pores have a diameter of 10 to 70 nm.
- 4. The oxide semiconductor electrode according to claim 1, wherein said titania particles have an average diameter of 10 to 70 nm.
- 5. The oxide semiconductor electrode according to claim 1, wherein said joined titania particles bear on their surface visible region sensitizing dye molecules.
- 6. The oxide semiconductor electrode according to claim 5, wherein said visible region sensitizing dye molecules are molecules of a ruthenium oxide complex.
- 7. The oxide semiconductor electrode according to claim 1, wherein said conductive substrate is formed of a flexible material.
- 8. The oxide semiconductor electrode according to claim 7, wherein said flexible material is a light transparent resin film.
- 9. The oxide semiconductor electrode according to claim 1, wherein said oxide semiconductor layer has a thickness of 10 to 70 μm_{\star}
 - 10. A process for producing the oxide semiconductor electrode as defined in claim 5, said process comprising the steps of: adding visible region sensitizing dye molecules to a solution of a titanium alkoxide; coating the solution with said visible region sensitizing dye

molecules added thereto onto a conductive substrate; and allowing a gelling reaction to proceed in the coating to form an oxide semiconductor layer.

11. A process for producing the oxide semiconductor electrode as defined in claim 1, said process comprising the steps of: coating a solution of a titanium alkoxide onto a conductive substrate; and applying ultraviolet light, ultrasonic waves in a liquid, or a high frequency to the coating before drying of the coating to allow a gelling reaction to proceed in the coating, thereby forming an oxide semiconductor layer.

5

10